The deviation in the case of the hydrogen thermometer at the boiling point of that gas, supposing Callendar's results to be correct, appears relatively small, though the discrepancy is really due to the method of expressing the results, a degree at the lower temperature having a greater thermo-dynamic significance than at the higher temperature.

The fact that the value of the deviation does not vanish at zero pressure may possibly be due to a tendency of the gaseous molecules to associate. This tendency would be less affected by change of pressure than by change of temperature.*

"On an Approximate Solution for the Bending of a Beam of Rectangular Cross-section under any System of Load.—Additional Note."

By L. N. G. Filon, M.A., D.Sc. Communicated by Dr. C. Chree, F.R.S. Received September 12, 1903.

My attention has lately been called by M. Flamant to certain discrepancies in some formulæ given by me in a paper recently published under the above title.†

On investigation I have found that a set of formulæ of the paper in question, namely, those of § 41, contained several inaccuracies.

I am unable to account for the introduction of these errors into the paper, and can only express my great regret that this mistake occurred and that I failed to detect it in time to remedy it before the paper was finally printed.

The most important of the final results, those relating to the stresses are, fortunately, correctly given.

The object of this short note is to give the results of § 41 of the paper referred to, in their amended form.

Equation (111) should read

$$\frac{B_1}{4} + D_1 + b^2\left(-\frac{15B_3}{4} - 3D_3\right) = 0$$

The equations following are correct, until we come to (128), which should be

$$B_3 = \frac{1}{3b^2}\left(D_1 + \frac{B_1}{4}\right),$$

$$D_3 = -\frac{1}{12b^2}\left(D_1 + \frac{B_1}{4}\right).$$

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* Ramsay, 'Phys. Soc. Proc.'

† 'Phil. Trans.,' A, vol. 201, pp. 63—155.

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The values of U, V, P, at the bottom of p. 149, should read

$$\mathrm{U} = \text{const.} + x\left\{\mathrm{A}_1\frac{\lambda'+3\mu}{8\mu(\lambda'+\mu)}+\frac{\mathrm{C}_1}{2\mu}\right\}+\frac{\mathrm{B}_1 y}{\mathrm{E}}+\frac{\mathrm{B}_2}{\mathrm{E}}2xy$$

$$-\frac{3}{8\mu}\frac{qxy}{b}+\left(\frac{\mathrm{B}_1}{4}+\mathrm{D}_1\right)\left\{\frac{y}{2\mu}+\frac{1}{b^2}\left[\frac{x^2y}{\mathrm{E}}-\frac{y^3}{3}\left(\frac{1}{\mathrm{E}}+\frac{1}{2\mu}\right)\right]\right\}$$

$$-\frac{q}{4b^3}\left\{\frac{x^3y}{\mathrm{E}}-xy^3\left(\frac{1}{\mathrm{E}}+\frac{1}{2\mu}\right)\right\}.$$

$$\mathrm{V} = \text{const.} - y\left\{\mathrm{A}_1\frac{\lambda'-\mu}{8\mu(\lambda'+\mu)}+\frac{\mathrm{C}_1}{2\mu}\right\}-\frac{\mathrm{B}_1 x}{\mathrm{E}}-\frac{\mathrm{B}_2}{\mathrm{E}}(x^2-\eta y^2)$$

$$-\frac{3q(x^2-y^2)}{16\mu b}+\left(\frac{\mathrm{B}_1}{4}+\mathrm{D}_1\right)\left\{\frac{x}{2\mu}-\frac{1}{b^2}\left(\frac{x^3}{3\mathrm{E}}-\eta\frac{xy^2}{\mathrm{E}}\right)\right\}$$

$$+\frac{q}{16b^3}\left\{\frac{x^4}{\mathrm{E}}-\eta\frac{6x^2y^2}{\mathrm{E}}+y^4\left(\frac{1}{\mathrm{E}}-\frac{1}{\mu}\right)\right\}.$$

$$\mathrm{P} = \left(\frac{3\mathrm{A}_1}{4}+\mathrm{C}_1\right)+2\mathrm{B}_2 y-\frac{3qy}{4b}+\frac{2xy}{b^2}\left(\frac{\mathrm{B}_1}{4}+\mathrm{D}_1\right)$$

$$-\frac{3}{4}\frac{x^2yq}{b^3}+\frac{qy^3}{2b^3}.$$

The values of Q and S at the bottom of p. 149 are correct.
The value of B_2 on p. 150 should be

$$\mathrm{B}_2 = \frac{3}{8}\frac{qa^2}{b^3}+\left(\frac{9}{40}\right)\frac{q}{b}.$$

The values of P, Q, S on p. 150 are correct.
The values of U and V, on the same page, ought to be

$$\mathrm{U} = \frac{\eta xq}{2\mathrm{E}}+\frac{3}{4}\frac{qa^2xy}{\mathrm{E}b^3}+\left(\frac{9}{20}\right)\frac{qxy}{\mathrm{E}b}-\frac{3}{8}\frac{qxy}{\mu b}-\frac{q}{4b^3}\left\{\frac{x^3y}{\mathrm{E}}-xy^3\left(\frac{1}{\mathrm{E}}+\frac{1}{2\mu}\right)\right\}.$$

$$\mathrm{V} = \frac{yq}{2\mathrm{E}}-\left(\frac{3}{8}\frac{a^2}{b^3}+\frac{9}{40b}\right)\frac{q}{\mathrm{E}}(x^2-\eta y^2)-\frac{3}{16}\frac{q(x^2-y^2)}{\mu b}$$

$$+\frac{q}{16b^3}\left\{\frac{x^4}{\mathrm{E}}-\eta\frac{6x^2y^2}{\mathrm{E}}+y^4\left(\frac{1}{\mathrm{E}}-\frac{1}{\mu}\right)\right\}.$$

In § 42 the value of $(d^2\mathrm{V}/dx^2)_{y=0}$, which was derived from the erroneous V of page 150, should be

$$-\frac{3}{4}\frac{(a^2-x^2)}{\mathrm{E}b^3}q-\frac{q}{\mathrm{E}b}\left\{\frac{6}{5}-\frac{3\eta}{4}\right\}.$$

Since η is negative (with zero for an extreme value), the last result shows that the constant term in the curvature is, in general, increased numerically by the correction. Further, this constant term involves the *two* elastic constants.

The general conclusions drawn with regard to the beam under a uniform load are in no way affected.

"On the Sensation of Light produced by Radium Rays and its Relation to the Visual Purple." By W. B. HARDY, F.R.S., Caius College, Cambridge, and H. K. ANDERSON, M.D., Caius College, Cambridge. Received September 20, 1903.

It is now well known that when a few milligrammes of a salt of radium are brought near the head in the dark a sensation of diffuse light is produced. We have examined this phenomenon with the object (1) of determining the place of origin of the sensation; (2) of identifying the particular rays which cause it.

The rays from radium falling upon the skin produce no sensation, and we failed in evoking sensations of sound, smell, or taste by their agency. The only response immediately traceable to them seems to be this one of diffuse luminosity.

It may be described as an appearance of diffuse light of steady intensity disposed in the external space in front of the head and filling that space fairly or quite uniformly. If the radium, covered of course with some opaque screen such as, for instance, black cardboard, to cut off the pale light which it emits, be held in front of one eye, one notices that the intensity of the glow is considerably reduced by closing the eyelid. When the eye is open it is possible in a very general way to locate the radium from the fact that the sensation is strongest when the axis of vision is directed to it and diminishes when the head is turned to one side. The sense of direction arises solely from variations in the intensity of the glow and not from variations in its quality.

When the eye is closed the sense of locality is completely lost. This is due to the fact, to be dealt with more fully presently, that the glow is due to the β and γ rays, and that the eyelid is peculiarly opaque to the former, stopping apparently the whole of them. The γ rays, on the other hand, having a very great penetrating power, pass almost equally well through the eyelid or through the bones and other tissues forming the orbit. There is, therefore, no possibility of a differential screening action when once the eyelids are closed and the β rays stopped, with the result that all sense of the direction of the source of light is lost.

The sensation of light is purely of retinal origin. It is not due to